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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/555,855

11/07/2005

Toshinori Ota

P/2850-120

4391

2352 7590 03/01/2010
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EXAMINER

MOWLA, GOLAM

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

03/01/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/555,855	Applicant(s) OTA ET AL.	
	Examiner GOLAM MOWLA	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-116 is/are pending in the application.
- 4a) Of the above claim(s) 2,4,6-14 and 16-116 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5 and 7-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/07/2005 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :11/07/2005, 09/01/2006 and 11/03/2008.

DETAILED ACTION

Election/Restrictions

1. Claims 2, 4, 6-14 and 16-116 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10/23/2009.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1, 3, 5 and 7 are rejected under 35 U.S.C. 102(a) as being anticipated by Horio et al. (JP 2003-037302, refer to online machine translation).

Regarding claims 1 and 3, Horio is directed to a thermoelectric semiconductor material, (see [0019-0035] and [0047] of the description; and figs. 1, 6, 7 and 9) produced by: adding excess Te to a predetermined stoichiometric composition of a compound thermoelectric semiconductor to form a raw alloy (see [0055], table 5, example 10); layering and packing plate shaped raw thermoelectric semiconductor materials 14 made of a raw alloy having a predetermined composition of a thermoelectric semiconductor to form a layered body; solidifying and forming the layered body to form a compact 61 (see fig.9c); applying pressure by forging to the

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compact 61 in a uniaxial direction that is perpendicular to a layering direction of the raw thermoelectric semiconductor materials 14, and thereby plastically deforming the compact 61 by applying a shear force in a uniaxial direction that is approximately parallel to the main layering direction of the raw thermoelectric semiconductor materials 14 (see figures 9c and [0035] and [0047]).

Regarding claims 5 and 7, the reference further discloses that the stoichiometric composition of the compound thermoelectric semiconductor is a $(\text{Bi-Sb})_2\text{Te}_3$ or $\text{Bi}_2(\text{Te-Se})_3$ based composition ([0017] and [0023]).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda et al. (US 6274802) in view of Horio et al. (JP 2003-037302, refer to online machine translation).

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Regarding claims 8 and 12, Fukuda is directed to a thermoelectric module comprising PN element pair (5 and 6, fig. 12) (1: 26-37 and 2:35-10:5), produced by plastically deforming (see abstract) respectively plate shaped raw thermoelectric semiconductor materials made of a raw alloy comprising a composition of P type thermoelectric semiconductor, and plate shaped raw thermoelectric semiconductor materials made of a raw alloy comprising a composition of N type thermoelectric semiconductor to form P type and N type thermoelectric semiconductor materials (see abstract and fig. 12 and 12:25-16:24); cutting out P type and N type thermoelectric semiconductor elements 5, 6 from the P type and N type thermoelectric semiconductor materials (9: 59-62 and 12:25-16:24) so that planes perpendicular to film thickness can be used as contact surfaces with an electrode (7); arranging the P type and N type thermoelectric semiconductor elements (5 and 6) in a crystallographic orientation of high thermoelectric capacity; joining the P type and the N type thermoelectric semiconductor elements 5, 6 via a metal electrode 7 to form a PN element pair, said thermoelectric module having a structure provided with said PN element pair.

However, the reference is silent as to layering and packing respectively the raw thermoelectric semiconductor materials, and solidifying and forming them to form compacts; applying pressure to the compacts having the compositions of P type and N type thermoelectric semiconductor in an axial direction perpendicular or approximately perpendicular to a main layering direction of the raw thermoelectric semiconductor materials; and thereby applying shear force in an axial direction approximately parallel

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to the main layering direction of the raw thermoelectric semiconductor materials for plastically deforming manufacturing

Horio is directed to a thermoelectric semiconductor material, (see paras.0019-0035 and 0047 of the description; and figs. 1, 6, 7 and 9) produced by: adding excess Te to a predetermined stoichiometric composition of a compound thermoelectric semiconductor to form a raw alloy (see [0055], table 5, example 10); layering and packing plate shaped raw thermoelectric semiconductor materials 14 made of a raw alloy having a predetermined composition of a thermoelectric semiconductor to form a layered body; solidifying and forming the layered body to form a compact 61 (see fig.9c); applying pressure by forging to the compact 61 in a uniaxial direction that is perpendicular to a layering direction of the raw thermoelectric semiconductor materials 14, and thereby plastically deforming the compact 61 by applying a shear force in a uniaxial direction that is approximately parallel to the main layering direction of the raw thermoelectric semiconductor materials 14 (see figures 9c and [0035] and [0047]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the method of Horio in the thermoelectric module production method of Fukuda to manufacture P- and N-type thermoelements with high performance index (see abstract of Horio).

Regarding claims 9-11 and 13-15, the references further discloses that the stoichiometric composition of the compound thermoelectric semiconductor is a $(\text{Bi-Sb})_2\text{Te}_3$ or $\text{Bi}_2(\text{Te-Se})_3$ based composition (see 16: 11-24 of Fukuda and [0017] and [0023] of Horio).

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GOLAM MOWLA whose telephone number is (571) 270-5268. The examiner can normally be reached on M-Th, 0800-1830 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ALEXA NECKEL can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795